OVERVIEW

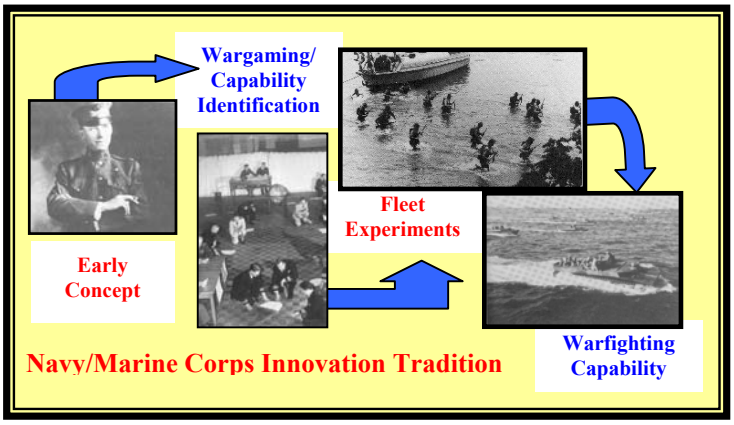
Why a Marine Corps Warfighting Laboratory?

In a world of great uncertainty, rapid technological diffusion, and potentially volatile conflict, it is vital that the Marine Corps aggressively explore new operational concepts, innovative organizational designs, and advanced technologies to meet tomorrow's challenges. The Marine Corps has a rich legacy of innovation including; amphibious warfare, close air support, maritime prepositioning, and tilt-rotor technology, but cannot rest on its laurels or current capabilities.

The emerging security environment places a premium on a continuous transformation of capabilities in order to maintain our competitive advantage over potential adversaries. Potential adversaries can seek out asymmetric tactics, or elect to confront U.S. forces in complex terrain, such as dense urban settings to offset American technological advantages. The future suggests that U.S. military preeminence could be short lived unless we stretch the competitive boundaries of existing capabilities or develop entirely new competencies that distinctly alter future military operations.

To ensure that the Marine Corps was prepared for the 21st Century, General Charles C. Krulak, created the Commandant's Warfighting Lab, back in 1995. Chartered to serve as an engine of change and the focal point for innovation, the Lab is a key component of the Marine Corps transformation effort.

It employs wargaming, simulation, and operational experimentation to test and validate technologies, concepts, and different organizational structures that result in increased capability. It also provides support to the Operating Forces to enhance the tactics, techniques and procedures used within today's force to extend and enhance current capabilities.



In short, the Lab operationalizes the Commandant's goals, stated in *Marine Corps Strategy 21*, to harness innovation and technology to ensure future Joint Force Commanders (JFC) have the necessary naval expeditionary capabilities they need.

Mission. The mission of the Marine Corps Warfighting Laboratory is as follows:

(The Lab) conducts concept-based experimentation to develop and evaluate tactics, techniques, procedures and technologies in order to enhance current and future warfighting capabilities.

Experimentation is conducted to meet Service *Title X* responsibilities. Service experimentation supports the Warfighting Advocates – Command Element, Ground Combat Element, Aviation Combat Element, and Combat Service Support Element – with the results supporting the Marine Corps Expeditionary Force Development System (EFDS)—the process by which the Marine

Corps translates concepts into fielded combat capabilities.

Joint experimentation is supported through the Marine Corps Combat Development Command's Joint Operations Center (JOC), the assigned lead for Marine Corps participation in Joint Forces Command's (JFCOM) joint experimentation program.

History

Established in October 1995, the Lab quickly established itself as a focal point for revolutionary ideas and innovation. Within 18 months, the Lab had developed a means for looking at change – called the *Sea Dragon Process*.

A major component of this process was a five-year experimentation plan – the Warrior Experimentation Series – each phase was intended to last approximately two years in length, culminating in an Advanced Warfighting Experiment (AWE). Each phase was given a title – *Hunter Warrior, Urban Warrior, and Capable Warrior* – reflecting the conceptual focus of the phase of the experimentation.

In 1997, the Lab executed *Hunter Warrior* as its initial major Advanced Warfighting Experiment involving West Coast Navy and Marine operational forces. This phase examined a number of concepts and issues related to sea-based power projection using emerging information technology, precision indirect weapons and dispersed ground units in an extended battlespace.

Beginning in 1997, the *Urban Warrior* experimental phase focused on the implications of information technology and new tactics in operations in urban environments. The culminating event of this phase was a major urban experiment in Oakland, CA in the summer of 1999.

The *Capable Warrior* phase culminated in the summer of 2001 with an experiment in conjunction with the *Extended Littoral Battlespace Advanced Concept Technology Demonstration* to explore the impact of emerging broadband wireless technologies, intelligent agent decision support tools, and collaborative decision-making systems on sea-based operations in an extended battlespace with multiple maneuver units.

In 2002, the Lab executed *Millennium Dragon* 2002 (MD 02). MD02 supported the Marine Corps service contribution to JFCOM's *Millennium Challenge 2002* experiment. MD02 was conducted from 24 July to 15 August 2002 at MCB Camp Pendleton and at the former George AFB, Victorville, CA. The Lab conducted three experiments during the I Marine Expeditionary Force STOM operation, then executed seven days of limited objective experiments, and finally conducted a 96-hour urban combined-arms experiment. Experimentation focused on urban reconnaissance, surveillance and target acquisition; emerging command, control and communications capabilities; a lighter and more robust surgical care facility collocated with the battalion aid station; and an infantryman's combat identification system.

Since completion of MD02, the Lab has been focused on two experimentation goals: (1) assisting the Operating Forces in implementing the results of MD02 – specifically Basic Urban Skills Training – and (2) preparing for the Sea Viking 04 Advanced Warfighting Experiment to be conducted during the last quarter of 2004 on the West Coast.

The Dragon as a Symbol of Change

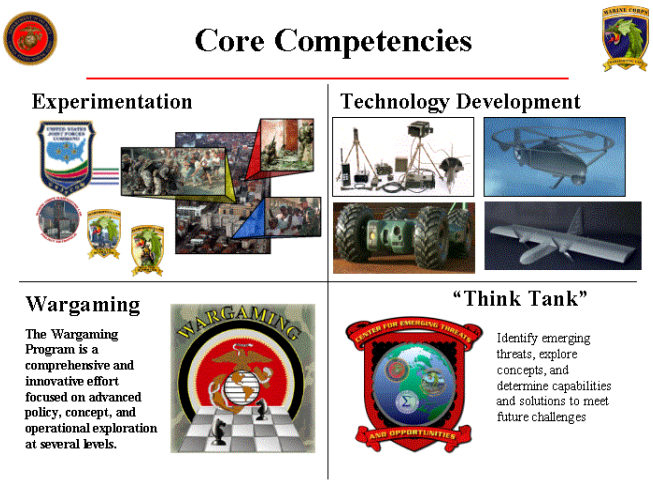
Since its inception, the Lab has adopted the *dragon* as its unique emblem representing the Lab's commitment to an open exploration of change. The *dragon* has appeared within each successive logo used by the Lab. Its perhaps apocryphal source is that of an ancient Chinese proverb about change:

Change is like a dragon. You can stand in its way, in which case it will destroy you with its power. You can run from it, in which case it will rapidly overtake and bury you. Or you can jump on its back, and let it take you where it will into the future.

The *dragon* has been used throughout the history of the Lab in the nicknames for Lab-specific technologies such as the *Dragon Drone, Dragon Eye*, and *Dragon Warrior* unmanned aerial vehicles, the *Dragon Fire* advanced mortar system, and the *Dragon Runner* unmanned ground vehicle.

Organization

The Lab has been organized to provide core competencies of experimentation, wargaming, technology development and a think tank in support of its innovation and experimentation mission.



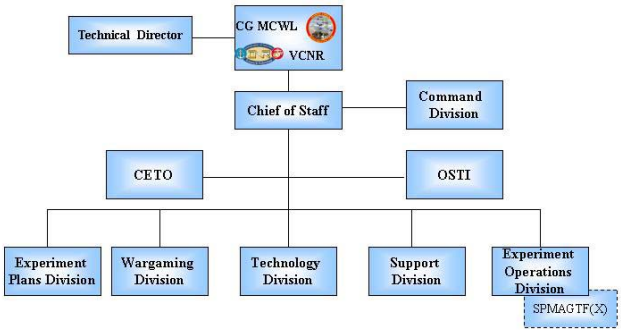
The Experiment Plans Division determines the concept or ideas for change, the Wargaming Division refines the concept and provides capability insights, the Technology Division identifies equipment and technology candidates for experimentation, the Experiment Operations Division conducts detailed planning and executes experiments, and the Support Division assists both in planning and execution.

The Operations Division is dual assigned as a Special Purpose Marine Air-Ground Task Force, Experimental (SPMAGTF (X)— command element capable of assuming command of operational forces during experimentation.

The Office of Science, Technology, and Integration (OSTI). The OSTI oversees the Marine Corps Science and Technology Process aimed at enhancing the warfighting capabilities of the Marine Corps. It develops the vision, policies, and strategies to exploit scientific research and technology development. It integrates and focuses the Science and Technology (S&T) efforts in support of experimentation and the EFDS.

In addition, OSTI is developing and managing the Lab's Science & Technology Operations Information Center (STOIC). STOIC is a computer-based system, which has the look and feel of a Web Site, and will allow the Lab to manage its initiatives, experiments, funding, and share information from a central, Internet-enabled application.

MCWL Organization



The Center for Emerging Threats and Opportunities (CETO). The CETO is a Congressionally mandated organization conducted in partnership between the Lab and the Potomac Institute for Policy Studies. It is chartered to identify emerging threats, explore concepts, and determine capabilities and solutions to meet future challenges in coordination with the Operating Forces and make recommendations to CG MCWL as to emerging capabilities that are candidates for transition to the Expeditionary Force Development System. Current efforts are: Anti-Terrorism/Force Protection/Homeland Defense, Enhanced Blast Effect Weapons study, and issues of special interest to the senior leadership of the Marine Corps such as options for organizing the Marine Corps in MAGTFs, an Operational Assessment of the Taiwanese Marine Corps, and Child Warriors.

Project Albert

Project Albert is a research effort to assess the general applicability of complex adaptive systems to land warfare, and to provide new methodologies for investigating the results of running such models, and incorporating those results with other, more traditional, methods of analysis.

While models based on the theory of complex adaptive systems (called distillations) are intentionally simple, they have the potential to provide insight into evolving patterns of macroscopic behavior that result from collective interactions of individual agents. Operational Synthesis and Data Farming are concepts whose goals are to explore a particular distillation's possibility space, and incorporate those results into the next 'layer' of analysis. The following topic areas represent some of the sub-components of Project Albert:

- Data Visualization, Nonlinearity, Intangibles, and Coevolution
- Prototyping Models and Techniques for Understanding Warfare
- Decision Making and Command Processes

Vice Chief of Naval Research. In 1998, the Commanding General of the Lab was assigned the additional responsibility as Vice Chief of Naval Research and assumed a major role in oversight of Marine Corps related Naval Science and Technology.

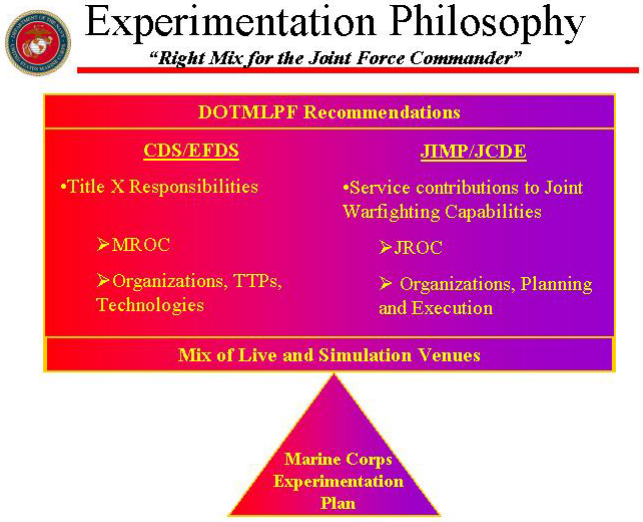
Joint Experimentation Support

Based on the need to balance competing demands the Lab is guided by the philosophy below.

The Marine Corps experimentation philosophy is targeted at producing the right mix of Marine Corps capabilities for the Joint Force Commander. The key to producing the right

mix of capabilities is to ensure that Marine Corps capabilities support joint concepts and where appropriate embed or merge Title X requirements and processes with Joint venues and processes. The goal of this integrated approach is to produce complimentary service and joint Doctrine, Organization, Training, Material, Leadership, Personnel and Facilities (DOTMLPF) recommendations.

Based on this philosophy the Lab examines the direction of United States Joint Forces Command's experimentation to identify those unique future Marine Corps capabilities that have the potential to contribute to Joint capability development.



The primary support to Joint Experimentation is conducted within Marine Corps Wargaming Division as part of the Title X wargaming effort.

Areas of Efforts

The Lab has organized its efforts into in order to focus experimentation in areas of effort that reflect both Service-specific and Marine Corps contributions to future Joint warfighting capabilities.

Each Area of Effort is addressed in detail within Section II.

Areas of Effort

- **Command and Control/Information Technology (C2IT)**
- **Reconnaissance, Surveillance, and Target Acquisition (RSTA)**
- **Fires and Maneuver**
- **Logistics**
- **Wargaming**
- **Emerging Threats and Opportunities**

The Marine Corps Warfighting Laboratory is a focal point for exploring future warfighting concepts and experimentation in support of both the Marine Corps and the Joint Concept Development and Experimentation process. As the Marine Corps adapts to the challenges and uncertainties of the 21st century, it must continuously evolve today's highly capable expeditionary forces and aggressively explore new ideas and advanced technologies that contribute to transformational breakthroughs via rigorous experimentation.

Innovation and Experimentation Process

The Innovation and Experimentation (I&E) Process describes the procedures for experimentation development from beginning to end. Each experiment is different. The I&E process organizes experimentation into manageable and logical steps. It provides a schematic appreciation of the steps required to formulate an experiment through transition of the results into the Expeditionary Force Development System (EFDS). A detailed description of the I&E process is available on the Lab's web site at: http://www.mcwl.quantico.usmc.mil/document/I&eprocess.pdf